WHAT IS CLAIMED IS:

1. An assay device comprising:

a substrate and an optically transparent cover, the substrate comprising

a first surface,

at least one sample receiving chamber for a liquid sample,

at least one distributor channel in fluid communication with the at least one sample receiving chamber,

at least one reaction chamber comprising a recess in the first surface,

at least one inflow channel in fluid communication with the at least one distributor channel and the at least one reaction chamber, and

at least one vent in fluid communication with the at least one reaction chamber,

wherein the optically transparent cover seals the first surface, and the substrate comprises at least a portion adjacent the at least one reaction chamber and which has a thermal conductivity of about 0.25 W/m°K or greater.

2. The assay device of claim 1, wherein the at least one distributor channel and the at least one inflow channel are each dimensioned to enable liquid sample transport therethrough and into the at least one reaction chamber by capillary action.

3. The assay device of claim 1, wherein the portion has a thermal conductivity of about 0.5 W/m°K or greater.

4. The assay device of claim 1, wherein the portion has a thermal conductivity of about 1.0 W/m°K or greater.

5. The assay device of claim 1, wherein the portion has a thermal conductivity of about 2.0 W/m°K or greater.

6. The assay device of claim 1, wherein the portion has a thermal conductivity of about 5.0 W/m°K or greater.

7. The assay device of claim 1, wherein the at least one reaction chamber comprises a plurality of reaction chambers.

8. The assay device of claim 7, wherein the substrate comprises an opaque material that is capable of preventing optical cross-talk between the plurality of reaction chambers.

9. The assay device of claim 1, wherein the substrate comprises a first material and a thermally conductive filler, and the first material comprises a glass, a ceramic, a silicon, a polystyrene, a polyamide, a polyester, a polyethylene, a

polyethyleneterephthalate, an acrylonitrile, a cyclic polyolefin, a syndiotactic polystyrene, a liquid crystal polymer, or a combination thereof.

10. The assay device of claim 1, wherein the substrate comprises a first material and a thermally conductive filler, and the first material comprises a polypropylene, a polycarbonate, or a combination thereof.

11. The assay device of claim 1, wherein the substrate comprises a thermally conductive filler and the thermally conductive filler comprises carbon black, carbon fiber, metal particles, graphite, talc, boron nitride, or a combination thereof.

12. The assay device of claim 1, wherein the substrate comprises an aromatic polyester, an aromatic-aliphatic polyester, an aromatic poly (ester-amide), an aromatic-aliphatic poly (ester-amide), an aromatic polyazomethines, an aromatic polyester-carbonate, a copolymer thereof, or a combination thereof.

13. The assay device of claim 1, wherein the substrate comprises a material having a melting point, a softening temperature, or a glass transition temperature of greater than about 115°C.

14. The assay device of claim 1, further comprising a venting channel, wherein the at least one vent comprises a plurality of vents, the at least one reaction chamber comprises a plurality of reaction chambers, each of the plurality of reaction chambers is respectively in fluid communication with at least one of the plurality of vents, and each of the plurality of vents is in fluid communication with the venting channel.

15. The assay device of claim 14, wherein each of the plurality of vents comprises a channel that includes a capillary stop, in fluid communication with a respective one of the plurality of reaction chambers and the venting channel.

16. A method comprising:

introducing a liquid sample into one or more sample receiving chambers of an assay device;

moving the liquid sample from the one or more sample receiving chambers through one or more channels and into a plurality of reaction chambers in the device, the plurality of reaction chambers between covered by an optically transparent cover;

venting gas from the plurality of reaction chambers through a venting system in the device, the venting system being in fluid communication with the plurality of reaction chambers, while preventing liquid sample from exiting the plurality of reaction chambers; and

increasing the temperature of the liquid sample in the plurality of reaction chambers at a rate of about one °C/second or greater.

17. The method of claim 16, wherein increasing the temperature comprises increasing the temperature of the liquid sample in the plurality of reaction chambers at a rate of about 2°C/second or greater.

18. The method of claim 16, wherein increasing the temperature comprises increasing the temperature of the liquid sample in the plurality of reaction chambers at a rate of about 5°C/second or greater.

19. The method of claim 16, further comprising thermally cycling the liquid sample in the plurality of reaction chambers.

20. The method of claim 19, wherein the thermally cycling comprises cycling the liquid sample between temperatures of about 60°C and about 95°C.

21. The method of claim 19, further comprising detecting fluorescence emissions from one or more of the plurality of reaction chambers during thermal cycling.

22. The method of claim 19, further comprising irradiating the plurality of reaction chambers with excitation beams and detecting fluorescence emitted from the plurality of reaction chambers, during the thermal cycling.

23. The method of claim 16, wherein moving the liquid sample comprises moving the liquid sample by capillary action.

24. The method of claim 16, wherein each of the plurality of reaction chambers contains a respective set of reactants for a respective gene expression or genotyping assay.

25. The method of claim 16, wherein each of the plurality of reaction chambers contains a respective set of reactants for at least one respective gene expression or genotyping assay, and each respective set of reactants differs from at least one other set of the respective sets of reactants.

26. The method of claim 16, wherein the assay device comprises a substrate and the substrate comprises a thermally conductive filler.

27. The method of claim 16, wherein the moving the liquid sample from the one or more sample receiving chambers through the one or more channels and into the plurality of reaction chambers in the device comprises:

moving the liquid sample from the one or more sample receiving chambers into one or more distributor channels;

moving the liquid sample from the one or more distributor channels into one or more inflow channels, wherein the one or more inflow channels is in fluid communication with the one or more distributor channels and with the plurality of reaction chambers; and

moving the liquid sample from the one or more inflow channels into the plurality of reaction chambers.

28. The method of claim 27, wherein the liquid sample flows into the plurality of reaction chambers by capillary force until the plurality of reaction chambers are substantially filled with the liquid sample.

29. The method of claim 16, wherein the liquid sample comprises one or more nucleic acid sequences, and the method further comprises amplifying the one or more nucleic acid sequences in one or more of the plurality of reaction chambers.

30. A method comprising:

introducing a liquid sample containing a nucleic acid sequence into one or more sample receiving chambers of an assay device;

moving the liquid sample with capillary force from the one or more sample receiving chambers through one or more channels and into a plurality of reaction chambers in the device, the plurality of reaction chambers being covered by one or more optically transparent covers;

venting gas from the plurality of reaction chambers through a venting system in the device, the venting system being in fluid communication with the plurality of reaction chambers, while preventing liquid sample from exiting the plurality of reaction chambers; and

amplifying at least a portion of the nucleic acid sequence in one or more of the plurality of reaction chambers.

31. The method of claim 30, wherein moving the liquid sample from the one or more sample receiving chambers through the one or more channels and into the plurality of reaction chambers, comprises:

moving the liquid sample from the one or more sample receiving chambers into one or more distributor channels; and

moving the liquid sample from the one or more distributor channels through one or more inflow channels and into the plurality of reaction chambers; wherein

the liquid sample flows into the plurality of reaction chambers by capillary force until the plurality of reaction chambers are substantially filled with liquid sample.

32. The method of claim 30, further comprising thermally cycling the liquid sample in the plurality of reaction chambers.

33. The method of claim 30, further comprising increasing the temperature of the liquid sample in the plurality of reaction chambers at an average rate of about one °C/second or greater.

34. The method of claim 30, wherein each of the plurality of reaction chambers contains a respective set of reactants for at least one respective gene expression or genotyping assay, and each respective set of reactants differs from at least one other set of the respective sets of reactants.

35. The method of claim 30, wherein the assay device comprises a substrate and the substrate comprises a thermally conductive filler.